

WHAT IS CLAIMED IS:

*Sub A17*  
1. A multi-zone drying cylinder roll for the through-air processing of permeable and semi-permeable webs which comprises:

a plurality of conduits having channels extending radially and longitudinally within said drying cylinder;

means for drawing air through said conduits;

said conduits having inlet port means for distributing air flow into longitudinal chambers within each conduit;

said conduits having outlet port means for distributing air flow out of said longitudinal chambers; and

means for dividing said conduits between the outlet port means and the inlet port means.

2. The drying cylinder of Claim 1 wherein said means for dividing said conduits is a vertically disposed air dam.

3. The drying cylinder of Claim 2 wherein said conduits are enclosed within an outer shell and said inlet port means and outlet port means consist essentially of perforations within said outer shell.

4. The drying cylinder of Claim 3 wherein said perforations consist essentially of a plurality of apertures for distributing process air uniformly throughout the cylinder.

5. The drying cylinder of Claim 4 wherein said apertures are successively smaller as they approach said air dam.

6. The drying cylinder of Claim 4 in which there is disposed within said outer shell an air distribution means in the form of an inner cylinder which divides each conduit into an inner chamber and an outer chamber, said inner cylinder having flow port means which communicate with said inner and outer chambers so as to distribute air flow therebetween.

7. The drying cylinder of Claim 2 enclosed within a housing, said housing comprising an intake duct for allowing air to flow to a first drying surface area of the drying cylinder and an exhaust duct for allowing air to be expelled out of a second drying surface area of the drying cylinder.

8. The drying cylinder of Claim 7 including a pair of seals extending longitudinally along the drying cylinder for preventing air flow into and out of a sector of said drying cylinder to provide a region for the installation and removal of said web.

9. The drying cylinder of Claim 3 wherein said outer shell consists essentially of a support structure covered by a screen.

10. The drying cylinder of Claim 7 including a second intake duct for allowing air to flow to a fourth drying surface area of the drying cylinder and a second exhaust duct for allowing air to be expelled out of a fourth drying surface of the drying cylinder.

11. The drying cylinder of Claim 7 including a first, second, and third seal, said first seal being disposed between said intake and exhaust ducts and extending circumferentially around said drying cylinder such that air is restricted from passing directly from said intake duct to said exhaust duct, said second and third seals being disposed circumferentially around either end of said drying cylinder contiguous to said intake and exhaust ducts respectively such that air is restricted from passing between said ends of drying cylinder and said ducts.

12. The drying cylinder of Claim 10 including a first, second, third, and fourth seal, said first seal being disposed between said first mentioned intake and exhaust ducts and extending circumferentially around said drying cylinder such that air is restricted from passing directly from said first mentioned intake duct to said first mentioned exhaust duct, said fourth seal being disposed between said second mentioned intake and exhaust duct and extending circumferentially around said drying cylinder such that air is restricted from passing directly from said mentioned intake duct to said second mentioned

exhaust duct, said second and third seals being disposed circumferentially around either end of said drying cylinder contiguous to said intake and exhaust ducts respectively such that air is restricted from passing between said ends of said drying cylinder and said ducts.

13. The drying cylinder of Claim 3 wherein air is exhausted through said outer shell and air flow is controlled by varying the length of the shell.

14. The drying cylinder of Claim 13 wherein air is impelled through the shell of said drying cylinder and the exhaust area is expanded by extending the width of the roll.

15. The drying cylinder of Claim 13 wherein the available area for exhausting air is increased by increasing the length of the cylinder.